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CORRESPONDENCE.

Philadelphia, Dec. 1, 1874.

JOHN H. RAUCH, M.D.,

Late Sanitary Superintendent of Chicago, Ill.

DEAR SIR:—

In behalf of the Committee of Citizens on the Schuylkill Drove-Yard and Abattoir, I would respectfully ask you to favor us with your opinion as to the advantages and disadvantages of the proposed location, and the probable influence of such an establishment upon the sanitary condition of this city; and if you should consider the proposed site to be objectionable, we would be glad to know where you think it ought to be located.

You will please bear in mind that the fat and refuse are not to be utilized on the premises, but are to be removed to a rendering establishment to be erected further down the river. With regard to this latter, we would be glad to have your opinion as to the distance at which it ought to be placed from the built-up portions of the city.

We would also like to have from you an approximate estimate of the probable average number of animals that will be stabled in the drove-yard, and be daily slaughtered in the abattoir. The Railroad Company informs us that the eventual capacity of the yard is to accommodate 7500 cattle, 8000 hogs, and 12,000 sheep.

Your reputation as a sanitarian, and your special experience for many years in these particular subjects, may serve as our excuse for thus requesting an expression of your views.

Very respectfully,

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JOHN SELLERS, JR., *Chairman.*

The undersigned desire to express their full approval of the conclusions reached by Dr. J. H. Rauch, and to commend them to the serious consideration of the citizens of Philadelphia.

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LEONARDO S. CLARK, M.D.,

W. T. TAYLOR, M.D.,

J. D. NASH, M.D.,

JOHN H. BRINTON, M.D.

Letter to a Committee, who are to propose a site for the abattoir.

RESOLUTION OF THE COLLEGE OF PHYSICIANS,

ADOPTED DECEMBER 2, 1874.

Resolved, That in the opinion of the College of Physicians of Philadelphia the establishment of the proposed Schuylkill Drove Yard and Abattoir, on the west bank of the Schuylkill River, between Market Street and Fairmount, would be in a high degree pernicious to the health interests of the inhabitants of Philadelphia."

ACTION OF THE PHILADELPHIA COUNTY MEDICAL SOCIETY.

At a meeting of the Philadelphia County Medical Society, held December 9, 1874, the following resolution was adopted as the action of the Society, and directed to be sent to the President and Board of Directors of the Pennsylvania Railroad and to be printed in the daily papers:—

"To the President and Directors of the Pennsylvania Railroad—

"We, the members of the Philadelphia County Medical Society, feeling a deep interest in the sanitary condition of our city, and in all preventive measures calculated to arrest threatened danger to the same, respectfully and earnestly protest against the contemplated erection of a Stock Yard and Abattoir on the Schuylkill above Market Street, believing that such works would be highly prejudicial to the health of our city."

ACTION OF THE NORTHERN MEDICAL ASSOCIATION OF PHILADELPHIA.

The Northern Medical Association, at a meeting held December 10, 1874, fully approved and endorsed the sentiments expressed in the letter of Dr. Rauch.

CHAS. CARTER,

Secretary.

PHILADELPHIA, Dec. 8, 1874.

TO JOHN SELLERS, JR., ESQ.,

*Chairman of Committee of Citizens on the proposed Schuylkill
Drove Yard and Abattoir.*

SIR: Before replying to your communication I would state, by way of explanation, that my replies to the queries propounded before the American Public Health Association, at its recent meeting in this city, were of a general character, and did not apply specially to the Abattoir and Stock Yards, as proposed to be conducted at West Philadelphia. Since then I have carefully examined that site and considered all the conditions bearing upon it, and in this letter I propose to discuss the questions connected with that enterprise.

In response to your inquiry as to the advantages of the proposed location, I would say that, in my opinion, they are purely commercial, and in this respect it is, in some points, superior to any other within or near the limits of Philadelphia; but from a strictly sanitary standpoint it is one of the most undesirable that could be selected.

In your letter you state that the Pennsylvania Railroad Company designs the Stock Yards eventually to have a capacity for storing 7500 head of cattle, 8000 hogs, and 12,000 sheep. It is, therefore, safe to assume that 3000 head of cattle, 3000 hogs, and 6000 sheep, will generally be collected here at one time. From these, in spite of all possible care, exhalations will arise that cannot be prevented. It is true that on many days the presence of this number of animals will not be noticed a short distance beyond the inclosure, but there will be days when, owing to the location, high temperature, and certain atmospheric conditions, the air will be tainted for at least a mile in the direction of the wind. I have repeatedly noticed the "cattle odor" half a mile from a distillery where only 1000 head were stabled, and in a locality where the atmospheric conditions were more favorable than they possibly could be at the proposed yards here.

The slaughtering of animals, under the most favorable circum-

stances, cannot be conducted without more or less smell. From its very nature, it is a filthy operation, and it is not presuming too much to say that even if conducted with the care proposed, there will be times when the atmosphere will be polluted from the abattoir. The killing of 800 head of cattle, 1500 hogs, and 2000 sheep daily in this locality, which will be about the amount required for consumption in this city in 1875, and, if not then, certainly in 1876, cannot always be carried on without offence to the surrounding district.

From this amount of slaughtering there will have to be removed daily from the cattle about 20 tons of offal, from the hogs 15 tons, and from the sheep 7 tons, with about 2500 gallons of cattle blood, 1300 of hog blood, and 700 of sheep blood, making in all about 55 tons of refuse for rendering and utilization. Owing to the character of this material, decomposition soon takes place, and, therefore, at times it cannot be removed without being offensive. This is especially the case when, from accident or some other unavoidable cause, its removal is not promptly effected. The fat for rendering can, as a general rule, be taken away without any trouble, but the removal of the heads, hoofs, and manure cannot always take place from this locality without smell. It is true, that by the free use of disinfectants this objection can be partially obviated, but their application is not always practicable.

From the meteorological observations of Prof. Fitzgerald, as recorded in the Franklin Institute, I find that for the years 1872 and 1873, during the months of June, July, August, and September, when the exhalations from the proposed abattoir and stock yards will be most rife, owing to high temperature, the wind was for two-thirds of this period from a westerly direction; most frequently from the S.W., next from the N.W. Then occur the N.E., S.E., W., S., N., and E., winds in the order named. The mean daily temperature for the same years was for June, 75°, July, 81°, August, 78°, and September, 69°.

With this high temperature during the prevalence of the S.W. wind, it is safe to assume that the odors of this establishment at times, without any rendering or the utilization of refuse being done, will be observable as far as Coates and Broad Streets. When from the West, as far as Broad, and from the N.W., as far as Pine and 18th Streets. Occasionally it will be noticed beyond these limits. The influence of these exhalations upon life will be felt in about two-thirds of the district indicated, according to

density of population, compactness of buildings, and other local conditions, and especially at the Children's Hospital. While it is true that it would be difficult to point out a single case where these emanations have directly caused death, I have repeatedly observed their effect at Chicago, in increasing the death-rate of a particular locality when the wind was blowing in a southeasterly or southwesterly direction, from one of these establishments for several consecutive days, with a high temperature, while the death-rate was not increased in localities remote, with the wind in the same direction, and the other conditions that affect life being the same. It may be said that other influences destructive to life were at work at this time, but even taking these into consideration, I could not avoid the conclusion that the emanations from these establishments were an important factor in increasing the death-rate, especially of the infantile diseases incident to summer, as well as in cases debilitated by other diseases. In other words, they increase the destructive influence of certain atmospheric contaminations existent under high temperatures especially where population is dense. On the west side of the Schuylkill the exhalations will be observed when the wind is from the N. E., in the neighborhood of the Almshouse; when it is from the E., about 40th Street; and when from the S. E., about Aspen Street. The effect upon life will be less marked than on the east side, since the population is less dense, while the easterly winds are less frequent and such winds generally are of a lower temperature. It will, however, increase the death-rate in the University and Blockley Hospitals, particularly in the latter, as in institutions of this character the patients are necessarily more susceptible to such influences.

There will also be occasions when, owing to the fact that the establishment is to be located upon lower ground than the residences in the neighborhood, the odors from it will be noticed only at higher and more remote points. The topography of the locality prevents that free and constant access of air which is, from a sanitary standpoint, one of the most important preventives of foul odors. Thus there will result accumulations of this character, and then owing to certain atmospheric conditions they will ascend until they strike a current of air to be wafted to and be observed at a distance. In New York, the residents on Murray Hill are frequently annoyed by noxious odors when nothing is observed near the source from whence they emanate. These

conditions obtain most frequently at night, and it is in this way that during the summer months, sleeping rooms are contaminated, owing to the fact that the windows are open. If the establishment were to be located on a hill or a plain, so that there would be free access for the winds from all directions, or, in other words, its ventilation better, this objection would in a very great measure be obviated.

The most important objection, from a sanitary standpoint, to the proposed abattoir and stock-yards will be the necessary drainage of refuse matter into the Schuylkill River. In fact, without good drainage and a large supply of water it is impossible to conduct establishments of this magnitude without their becoming great nuisances, and just in proportion as they are kept in a cleanly condition will the river be polluted. I find upon examination of the records in the office of the City Engineer that the current of the river is on the east side, and that, generally speaking, there is but little on the west side, save such as is incident to the rise and fall of the tide, which, owing to the winding character of the river, and perhaps Fairmount Dam, is by no means as rapid as in the Delaware. If the cattle are slaughtered in the mode at present adopted in the best establishments, there will be at least five pounds of blood, meat, and other refuse from each animal carried into the river. This is a low estimate, and no doubt frequently too low. From the hogs nearly two pounds each, and from the sheep about two ounces. There will also be daily carried into the river from the cattle stabled at least one pound per head of excreta, about the same quantity per hog, and about two ounces per sheep. This last calculation is based upon the supposition that the yards will be impervious to fluids, and that the drainage will be as complete as possible. Although the greater portion of the blood will be collected for utilization, there is necessarily some waste. This will be washed into the river where it will coagulate and sink, and unless the current is very rapid it will remain at the bottom of the river until the temperature of the water is such as to cause the putrefactive process to take place. I have frequently found coagulated blood at the bottom of the Chicago River months after it had been deposited, and when its presence had become manifest by the escape of noxious gases, the result of the decomposing process.

From the foregoing it will be observed that about 15,000 pounds of organic and decomposable material will daily enter

the river from this source. Although this estimate may seem large, I do not think that the establishment can be kept clean without this amount of waste material being carried into the river by frequent flushing, for it is so much easier to remove refuse in this way—particularly when the drainage is good, and water in abundance for this purpose—than by the slow process of collecting by hand, and removing to another locality. Indeed, much of it cannot be removed by hand; with the best intentions and most constant supervision it will be found impracticable, from the amount of time and labor required. Of course, this estimate does not include the manure, that can be readily disposed of.

As already remarked, the current of the Schuylkill is not rapid on this side, and it will soon be found, from the character of the refuse—as a large portion of it is animal matter—that at low tide much of it will be left in the docks and on the marshy grounds (overflowed at high tide), and shallow places on this side of the river for some distance below the abattoir. At low tide the action of the sun in midsummer would cause it to be the source of noxious exhalations, which would be carried by the winds over a much larger portion of the city than the emanations from the abattoir and stock-yards, and thus exercise a more widely spread influence upon health and comfort. I learn that the Railroad Company propose to build a sewer into the middle of the river, emptying into deep water, and where there is a more rapid current, so as to carry off this drainage. This will no doubt be better than if the mouth of the sewer should be at the west side of the river; but when there is little water flowing over the dam, it will not make much difference, as the ebb and flow of the tide, with the wind, will carry this material to every portion of the river.

From Mr. Smedley, the Chief Engineer of the city, I learn that only a small portion of the region lying west of the Schuylkill is sewered, and that, comparatively speaking, but little sewage from it empties into the river at this time, but that with the increase of population the sewers will have to be extended; also that the drainage of the lower part of the city lying east of the Schuylkill is limited. In this direction sewers are being rapidly built, the tendency of population being to the territory drained by the Schuylkill, so that with the natural increase and the addition from the proposed slaughtering and stock-yards (which will in itself be equal, at the lowest estimate, to the sewage of a

population of 20,000), it will soon be found that the river will become so much contaminated as to prove offensive and exercise an injurious influence upon the health of the city. The effect of this river pollution will be more marked when there is little or no water flowing over the dam at Fairmount, as frequently occurs, particularly in the summer months, since but little fresh water being added, the same water remains flowing upward and downward, while the daily addition of contaminating material remains the same. It should be borne in mind that the refuse matter from stock-yards and abattoirs, in undergoing the process of decomposition, gives off much more effluvia than ordinary sewage, so that combining the river pollution with the atmospheric contamination, I think it safe to say that the proposed establishment will be fully equivalent in its effects upon the atmosphere in the neighborhood of the river to the sewage derived from a population of at least 50,000 souls. The purification, by oxidation, of the ordinary sewage with the proposed additional refuse materials from the yard and abattoir flowing into the Schuylkill river with its present water supply, cannot be accomplished before it joins the Delaware. The purification of the Illinois and Michigan Canal, at Chicago, with like contaminating material, and with a constant supply of fresh water from Lake Michigan, requires a distance of from thirty to forty miles, at least double the distance being required for refuse animal matter than is needed for ordinary city sewage.

This river pollution will increase as population increases, until it will be necessary to construct an intercepting sewer, on one or both sides of the river, with pumping works near its mouth, to pump the sewage into the Delaware, at great expense.* This will become in the course of time a sanitary necessity.

Since the reception of your letter, and as attention has been called thereto, I have inspected the abattoir and stock-yards at Harsinus Cove, and do not hesitate to say, that, taking every-

* In the latter part of last July, while coming into the city on the West Chester Railroad, my attention was attracted by a foul and oppressive odor, and, from habit, I looked out of the car window to see from whence it had its origin. I found that we were approaching the Schuylkill River, and that the tide was low, and that the effluvia came from the low and marshy ground. Afterward, in crossing Chestnut Street bridge, I observed a similar odor coming from the docks, and, as I approached the east side, noticed the most offensive gas smell; altogether reminding me of the atmospheric impurities that several years ago were so common in the immediate neighborhood of the Chicago River.

thing into consideration, they constitute the most complete and best adapted establishment of the kind in the country, and, perhaps, in the world. In some respects, in mechanical construction, and certainly in location, they are superior to the Brighton abattoir and stock-yards near Boston, to the construction of which so much attention has been paid by the Massachusetts State Board of Health. At Brighton, however, hogs are slaughtered, and the rendering of fat and utilization of the refuse are carried on, which is not the case at Harsimus Cove. At the latter place albumen is manufactured from the blood, the remaining products being converted into a fertilizer without the process being specially offensive, while on the Schuylkill this operation cannot at all times be conducted without being offensive to a neighboring population. There is also a marked difference in climate, one being oceanic and the other continental. There is also at Harsimus a constant and free circulation of air, as there is no obstruction from any direction, and it is built at least four feet above the water, so that the air has even an opportunity to pass under it; while on the Schuylkill the site is, as it were, in a basin, and lower than the surrounding territory. In the summer when most annoyance is experienced from establishments of this character, a stiff sea breeze is frequent at Harsimus Cove, blowing up the North River, so that it really does not affect any one, while at West Philadelphia the prevailing winds will carry the emanations to the most densely populated and best built-up portions of the city. Harsimus Cove is so situated that in three directions it cannot possibly affect population. In the remaining quarter there is comparatively no population within half a mile, and only about fifteen thousand within a mile, and with the wind rarely blowing towards that point, while on the Schuylkill there is at least a resident population of one hundred and twenty-five thousand, including several large hospitals and other public institutions within reach of its influence. At Harsimus the water supply is unlimited, with a rise and fall of the tide of eight feet, flowing swiftly with the full volume of the North River; while on the Schuylkill the rise and fall of the tide is only six feet, and not rapid, with at times a small water supply in the river, or, in other words, the drainage from one establishment is to all intents and purposes daily removed, while at the other it cannot be. The mean daily temperature during the months of June, July, August, and September is at least 5°

lower at Harsimus Cove than at West Philadelphia, a very important difference, as high temperature is the chief factor in causing offensive smells. The day of my visit at Harsimus was one of the coldest of this season, and yet as I stepped into a small boat upon leaving the abattoir, at a point some distance from where the slaughtering was carried on, I noticed an odor as if it came from an old sewer or from blood and refuse that had been deposited in the river. I have no doubt that this will increase year by year.

It will, therefore, be seen that the conditions that obtain in the two localities are wholly unlike, and that to draw a comparison, or to say that what can be accomplished at one place in the conducting of this business can be done at the other, is simply impossible. I do not hesitate to say that at Harsimus Cove slaughtering is carried on with but little offence, and no injury to the public health; but I am equally positive in saying that it is not possible to do so at the proposed point on the Schuylkill.

In reply to the query, "At what distance should the rendering and utilization of the refuse be carried on from the built-up portions of the city?" I would state that this depends entirely upon the atmospheric conditions, the direction of the prevailing winds, the mode and character of the appliances for conducting these processes, the drainage and water supply. The *rendering* of clean, fresh fat or tallow is not necessarily an offensive operation, except in a warm, murky atmosphere, but the *rendering* of offal, and its utilization, under all circumstances, require constant care and attention, and even then, with all the improved machinery, cannot always be carried on without offence. In *rendering*, much water is used, and this, after the process is completed, is drawn off, necessarily impregnated with a large amount of organic material. The tank water or soup, as it may more properly be called, from rendering fresh fat and tallow, is not specially offensive, but that from rendering offal must necessarily be so from the fact that in this process the fatty matter is removed from the intestines, and the various glands and organs that are not otherwise used. It is estimated that from the offal of a bullock there are about 12 gallons of this liquid, which, if 800 are slaughtered daily, will amount to 9600 gallons, 3 gallons to each hog that is slaughtered, making a total daily of 4500 gallons, and one gallon per head of sheep, making 2000

gallons more, or a total daily of 16,500 gallons of this tank fluid that must be daily removed. It is from this source mainly that the South Branch of the Chicago River south of the Illinois and Michigan Canal is polluted. It is really a highly concentrated essence of the material that is rendered, containing variable quantities of ammonia, phosphorus, and nitrogen products that are valuable as fertilizers. Glue has also been manufactured from this result of the rendering process. So far, however, but little progress has been made in the utilization of the tank fluid, and at this time it is necessarily one of the chief causes of the pollution of streams into which these establishments drain. The necessity of a large water supply for the removal of this waste will be apparent. These processes should, therefore, be conducted on the Delaware below the mouth of the Schuylkill where water is abundant, and the remoteness from population would render it inoffensive.

This is the first time in the history of slaughtering, in this country, that it is proposed to locate a drove yard and abattoir in what may be termed the heart of a city, or what certainly will soon be the centre of population. As a general rule, this business has been driven away from population, in consequence of the inseparable conditions that follow it, and while it is true that many improvements have been made in the mode of conducting these operations, especially within the last five years, both from a commercial and sanitary standpoint, still taking all these into consideration, judging from my experience, and the general principles of sanitary science, I am of the opinion that they should not be tolerated where population is dense, or likely to become so. In spite of everything that can be done, offence will sometimes arise. I have more than once been led to hope from series of experiments, as well as from the great improvements in the machinery and appliances made to render the system a success, that the time might come when their existence in the midst of population might be safe and proper, but in this I have been disappointed.

There is probably no practical sanitary question that at this time, especially in our large cities, is attracting so much attention as this, and even with all the improvements that have been made at Chicago, it is by no means yet conducted so as not to be offensive or prejudicial to health. In Baltimore this question is under discussion, and in New York, steps are now being taken

toward improvement. In Great Britain the hygienic considerations involved are now regarded as of so much importance that a recent act of Parliament has been passed defining how the work is to be carried on, not only in the great cities, but throughout the entire kingdom.

The best site for an abattoir for this city is on the Delaware, near the mouth of the Schuylkill, from sanitary considerations, and possibly, also, from a commercial point of view, as here slaughtering and packing for exportation might be carried on—a branch of business, I believe, not conducted in this city, and quite an important item in the export trade of Boston.

At the proposed location on the Schuylkill the sanitary difficulties will yearly become greater, owing to increasing density of population, diminished water supply, accumulation of refuse, and inevitable contamination of buildings and grounds. The expense, also, incident to conducting two establishments for slaughtering and rendering so far remote from each other as will have to be done, will go far toward equalizing any supposed commercial advantages of the proposed site on the Schuylkill. On the Delaware all the different processes can be carried on, if not under the same roof, at least in close proximity.

In speaking as I have, I do not wish to be understood as undervaluing an abattoir system in this city, but, on the contrary, I heartily commend it, and do not hesitate to say that if the location is a proper one, it is far preferable to the present mode of slaughtering. As a general rule, slaughtering should not be carried on as a purely commercial enterprise, but under the supervision and control of the municipality. This applies with special force to cities, where slaughtering is done for home consumption.

Very respectfully,

JOHN H. RAUCH, M.D.